electronic flash does not emit a flash of light, and a discharge tube which receives an output from said capacitor and, in response thereto, produces the flash of light; and

Cancel A3 said system controller receives an output from said battery voltage detector circuit and determines whether a remaining amount of electric charge in the battery is below a predetermined value, and, if the remaining amount of the charge is below the predetermined value, does not permit displaying on said monitor and charging of said capacitor to occur simultaneously, such that the system controller prevents the capacitor from being charged while the monitor is displaying the image data when one screen of the image data is being recorded on the recording medium, and controls the monitor to be inoperative while said capacitor is being charged after one screen of said image data has been completely recorded on the recording medium.

12. The electronic camera is claim 11, wherein, after said capacitor has been completely charged, said system controller prohibits the capacitor from being charged and causes the monitor to operate. --.

IN THE ABSTRACT-

Page 27, line 20 Change ~~"not to be"~~ to --such that these operations are--.

REMARKS

In view of both the amendments presented above and the following discussion, the Applicants submit that none of the claims now pending in the application is anticipated under the provisions of 35 USC § 102 or obvious under the

provisions of 35 USC § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Peter L. Michaelson, Esq. at (732) 530-6671 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Specification, title and abstract amendments

Various amendments have been made to the specification to correct minor inadvertent grammatical, punctuation, idiomatic and formal errors.

In addition, the Examiner has requested that the Applicants amend their title of the application from that, as filed, to one more descriptive of the invention, as claimed. In response, the Applicants have now changed their title from "Electronic Camera and Battery Voltage Controlling Method Employed Therein" to --Electronic Camera and Battery Voltage Controlling Method Employed Therein for Successively, rather than Simultaneously, Operating Camera Portions during Conditions of Low Battery Voltage--.

New claims

Claims 11 and 12 are new. Independent claim 11 is similar, though narrower, than claim 1, as it now stands. Claim 12 depends from new claim 11.

Rejections

A. Rejections under 35 USC § 102(e)

The Examiner has rejected claims 7 and 8, as filed, under the provisions of 35 USC § 102(e) as being anticipated by the teachings in the Anderson et al patent (United States patent 5,963,255 issued to E. C. Anderson et al on October 5, 1999). With respect to claims 7 and 8, as they now stand, this rejection is respectfully traversed.

Specifically, the Examiner believes that the Anderson et al patent identically discloses all the elements in claim 7, as that claim stood prior to this amendment. In that regard, the Examiner states, with reference to col. 5, lines 43-48; col. 7, lines 23-32 and 40-46; and col. 8; lines 14-17, that when the camera disclosed in this patent detects that battery voltage falls below a predetermined value (e.g., 5.2 volts), a power management system in the camera shuts down power to individual components in the camera.

The Anderson et al patent, as the Examiner correctly perceives, does indeed disclose a power management system (PMS) for use in a digital still camera for extending useful life of a camera battery. Such batteries include, for example, a NiCd, alkaline or lithium battery. This system, as described in, e.g., col. 2, line 52 et seq.; col. 3, line 37 et seq. and col. 7, line 23 et seq. of this patent, detects battery voltage and as the battery continues to weaken, configures the camera, by successively shutting off power to various components in the camera, in order to place the camera in modes having incrementally reduced power

consumption. As explicitly described in col. 7, line 23 et seq., the system can place the camera in one of five modes: power state 5 (normal imaging power) through which all of the camera components are powered; power state 4 (low imaging power) through which a flash unit operates in a reduced power charging mode (i.e., charging at a slower rate) but apparently all other camera components are powered; power state 3 (restricted imaging power) through which the flash unit is shut down so as not to consume any power, though all other camera components are powered in order that the camera may "still capture additional images"; power state 2 (normal processing power) through which an image capture component and a signal processing unit are shut-down thus preventing the camera from capturing any additional images, but permitting a computer in the camera "to complete any outstanding processing functions"; and power state 1 (restricted processing power) through which if all processing has been completed, the computer initiates a power down shut down sequence, else all display and input/output (I/O) subsystems are shut down and no additional sector read/write command may be issued to a memory card.

As indicated in a state diagram shown in FIG. 6 and clearly discussed in col. 8, line 1 et seq. and also shown in the flowchart depicted in FIGs. 7A-7D and discussed in col. 10, line 29 et seq., once the detected voltage first falls below a threshold amount, the power management system takes immediate action. This action immediately changes the state of the camera, from, e.g., power management state 5, and based whether a flash unit is then charging or image capture component is then ON, to either power management states 4, 2 or 1. Likewise, based on the current status of

these components, the camera can transition from power states 4 or 3 to states 3, 2 or 1. What the Examiner must keep in mind is that once a state change occurs, the power management system shuts off power to an appropriate component(s) of the camera consistent with the new state, and the power to that component remains off during that state. This is evident in, e.g., step 624 shown in FIG. 7B which the patent explicitly describes in col. 10, line 62 et seq.:

> "In step 622, if the power source 74 voltage is less than the threshold voltage, the method continues on to step 624, else, the method returns to step 620. In step 624 the PMH [power management handler] 70 **immediately shuts off power to the flash unit** 66." [emphasis added]

Hence, in power state 3, for example, though the flash is off, imaging, display and other camera operations are powered and hence remain operative. As such, these remaining camera operations can still simultaneously occur, even though the flash is off.

The Applicants have discovered that further power reductions can be obtained not by permitting simultaneous use of camera components during a power saving mode -- as clearly taught by the Anderson et al patent, but rather through successive use of one camera component at a time, while other components are powered off.

In particular, through the present invention, whenever battery voltage decreases below a threshold, e.g., 50% of a maximum value, the flash is turned off while a monitor displays image data. In particular, during a power

saving mode, while image is being compressed and stored in flash memory, only the monitor remains operative but the flash is not charged. Once the image data has been stored, the monitor is powered off, and hence rendered inoperative, the flash is then powered for charging. Since the monitor displays data at one time and the flash charges at another time, i.e., both are staggered with respect to each other (operate successively), the load on the camera battery is lessened over that which would occur if both components operated simultaneously. Under the present invention, to conserve power, these operations occur successively with either occurring first followed by the other, i.e., alternating back and forth, but not both simultaneously. See, e.g., the present specification at page 20, line 7 et seq. and page 21, line 12 et seq. If more than two camera components exist which can be selectively powered to conserve battery power, then, these components can operate in various different orders as long as only one component operates at a time.

This time-staggered (time division) alternating approach, through which any one of two components can operate at a time, sharply contrasts with the relevant teachings in the Anderson et al patent. There, once a camera component is turned off by the power management system as a result of its transitioning to a new power management mode, that component remains off throughout the time the camera remains in that mode.

As the Examiner can readily appreciate, the approach taught by the Anderson et al patent strikingly differs from the Applicants' inventive time-staggered approach. The latter is simply not shown or disclosed,

whether implicitly or explicitly, in the Anderson et al patent.

Claim 7, as it now stands, contains suitable recitations directed to the distinguishing features of the present invention. In that regard, claim 7 now recites as follows, with these distinguishing recitations shown in a bolded typeface:

> "A battery voltage controlling method employed in an electronic camera, comprising the steps of:
> detecting whether an amount of electric charge remaining in a battery is below a predetermined value; and
> **successively performing displaying on a monitor and charging of a capacitor when said amount of electric charge remaining in said battery is below said predetermined value such that either one of two operations of displaying image data and charging the capacitor is completed before the other one of the operations occurs.**" [emphasis added]

Hence, the Applicants submit that claim 7 is not anticipated by the teachings in the Anderson et al patent. Consequently, this claim is patentable under the provisions of 35 USC § 102(e).

Claim 8 depends from claim 7 and recites further distinguishing features of the present invention. As such, claim 8 is not anticipated by the teachings of the Anderson et al patent for the exact same reasons set forth above. Hence, claim 8 is also patentable under the provisions of 35 USC § 102(e).

B. Rejections under 35 USC § 103

The Examiner has specifically listed claims 1, 2 and 5-8 as being rejected under the provisions of 35 USC § 103 for being obvious over the teachings in the Anderson et al patent. Though, in the first sentence in section 5 of the Office Action, the Examiner has only specifically delineated claims 1, 2 and 5-8 as being rejected, from the ensuing discussion in the remainder of this section it is clear to the Applicants, and the Applicants will so assume, that the Examiner intended to reject all claims 1-10, as they stood prior to this amendment, as being obvious in view of the teachings in the Anderson et al patent. Hence, the Applicants will address this rejection under that assumption. In that context, this rejection is respectfully traversed with respect to claims 1-10, as they now stand.

For the sake of brevity, the Applicants will not summarize the Anderson et al patent here but instead will merely direct the Examiner's attention to the argument in the preceding section of this amendment in which this patent is fully described.

Clearly, anyone of skill in the art when faced with the teachings of this patent, particularly its hierarchy of power saving modes, would think that at each different stage of power management, once a camera component is powered off, that component remains off. As the camera transitions to increasingly restrictive power consumption modes, additional camera components are simply powered off, until eventually, as in power management state 1, the camera is completely powered-down.

The Anderson et al patent contains no teachings whatsoever that would lead that person to consider using a power management approach in which separate camera components can operate in any order but in a staggered approach, such that only one component operates at a time, but that this one component can later return to operation once the other component ceases its operation. In fact, the Anderson et al patent by teaching a rigid hierarchy of camera operations teaches directly away from the present invention. Hence, the teachings in the Anderson et al patent would not lead that person of skill to the present invention.

Therefore, using a time-staggered approach for power management in an electronic camera has remained for the Applicants to recognize and for them to now teach as their present invention.

Claim 1, as it now stands, contains suitable recitations directed to the distinguishing aspects of the present invention. In that regard, claim 1 now recites as follows, with these distinguishing recitations shown in a bolded typeface:

> "An electronic camera comprising:
> a signal processing portion for processing an imaged video signal obtained from an imaging element to form image data;
> a monitor for displaying said image data;
> an electronic flash device;
> a battery for supplying current to said signal processing portion, said monitor and said electronic flash device;
> a battery voltage detector circuit; and

a system controller; wherein

said electronic flash device includes a capacitor charged when no light is emitted from the flash device, and a discharge tube which receives an output from capacitor and, in response thereto, emits light; and

said system controller receives an output from said battery voltage detector circuit, determines whether an amount of electric charge remaining in said battery is below a predetermined value, and controls displaying on said monitor and charging of said capacitor such that, when the amount of electric charge remaining in said battery is below said predetermined value, display of the image data and charging of the capacitor are not simultaneously performed and either one of two operations of displaying the image data and charging the capacitor is completed before the other one of the operations occurs." [emphasis added]

New independent claim 11 contains similar, though narrower, distinguishing recitations than those in claim 1, as indicated below in a bolded typeface:

"An electronic camera comprising:

a shutter key;

a signal processing portion for processing an imaged video signal obtained from an imaging element to form image data and storing said image data on a recording medium in response to operation of said shutter key;

a monitor for displaying said image data thereon;

an electronic flash device;

a battery for supplying current to said signal processing portion, said monitor and said electronic flash device;

a battery voltage detector circuit connected to said battery; and

a system controller connected to said battery voltage detector circuit, said monitor, said signal processing portion and said electronic flash device;

wherein:

said electronic flash device has a capacitor charged with current supplied from said battery when said electronic flash does not emit a flash of light, and a discharge tube which receives an output from said capacitor and, in response thereto, produces the flash of light; and

said system controller receives an output from said battery voltage detector circuit and determines whether a remaining amount of electric charge in the battery is below a predetermined value, and, if the remaining amount of the charge is below the predetermined value, does not permit displaying on said monitor and charging of said capacitor to occur simultaneously, such that the system controller prevents the capacitor from being charged while the monitor is displaying the image data when one screen of the image data is being recorded on the recording medium, and controls the monitor to be inoperative while said capacitor is being charged after one screen of said image data has been completely recorded on the recording medium." [emphasis added]

The distinguishing recitations in independent claim 7 are noted above in the preceding section of this amendment directed to the rejections under 35 USC § 103.

Hence, the Applicants submit that each of claims 1, 7 and 11 is not rendered obvious over the teachings in the Anderson et al patent. Therefore, each of

these independent claims, as it now stands, is patentable under the provisions of 35 USC § 103.

Each of dependent claims 2-6, 8-10 and 12 depends, either directly or indirectly, from independent claims 1, 7 and 11, respectively, and recites further distinguishing features of the present invention. As such, each of these dependent claims is not rendered obvious by the teachings of the Anderson et al patent for the exact same reasons set forth above. Hence, all of these dependent claims are also patentable under the provisions of 35 USC § 103.

Conclusion

Thus, the Applicants submit that none of the claims, presently in the application, is anticipated under the provisions of 35 USC § 102 or obvious under the provisions of 35 USC § 103.

Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

January 26, 2000

Peter L. Michaelson, Attorney
Reg. No. 30,090
Customer No. 007265
(732) 530-6671

MICHAELSON & WALLACE
Counselors at Law
Parkway 109 Office Center
328 Newman Springs Road
P.O. Box 8489
Red Bank, New Jersey 07701

CERTIFICATE OF MAILING under 37 C.F.R. 1.8(a)

I hereby certify that this correspondence is being deposited on **January 26, 2000** with the United States Postal Service as first class mail, with sufficient postage, in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

John C. Michaelson — 30,090

Signature — Reg. No.

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